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1. A car is speeding down the highway at 90 mph (132ft/s). The driver spots a cop and slows down to 55mph (80 ft/s). Determine the acceleration of the car if he applied the brake for 4.5 seconds.
2. A Gulfstream 5 jet accelerates down a runway at 3.20 m/s2. It accelerates for 32.8 s until is finally lifts off the ground. Determine the distance it traveled before takeoff.
3. If a ball is thrown upward, are the measure of these constant? Explain your answer.

Neglect air resistance.

* 1. Acceleration
  2. Velocity

1. Cali Crackers is riding a Freefall at ride at popular amusement park. If Cali Crackers free falls for 2.6 seconds, what will be her final velocity and how far will she fall?
2. One of the new roller coasters at Six Flags Great Adventure is Kingda Ka. It can launch it’s riders from 0 to 128mph (188 ft/s) in only 3.5 seconds.
   1. Find out how the coaster accelerates to accomplish this feat.
   2. This acceleration is the force that the rider feels when the train is launching. Determine how many times the force of gravity is. (Use 32 ft/ s2 as the force of gravity)
3. Cars cruise down an expressway at 25 m/s. Engineers want to design an interchange for a deceleration of −2.0 m/s**2** over 3.0 s.
   1. What velocity will cars have at the end of the approach?
   2. What minimum approach length will satisfy these requirements?
   3. What maximum velocity could a car entering the interchange have and still be able to exit at the intended velocity? (Assume an extreme deceleration of four times the usual rate.)
4. A typical commercial jet airliner needs to reach a speed of 180 knots before it can take off. (A knot is a nautical mile per hour and is very nearly equal to half a meter per second.) If such a plane spends 30 s on the runway estimate …
   1. Its acceleration.
   2. the minimum runway length.
5. A car with an initial velocity of 60 mph needs 144 feet to come to a complete stop. Determine the stopping distance of this same car, under identical conditions with an initial velocity of 30 mph, 20 mph, and 10 mph.
6. A ball is dropped from the top of a building. Neglecting air resistance, determine how long the ball will take to reach the ground if dropped off the roof of :
   1. The school building (30ft)
   2. The Empire State Building (1,250ft)
   3. The Burj Khalifa (2,717ft): The tallest building in the world
7. A ball is dropped on the moon from a height of 2.50 meters. The acceleration of gravity on the moon is 1.67 m/s2. Determine the time for the ball to fall to the surface of the moon.
8. With what speed in miles/hr (1 m/s = 2.23 mi/hr) must an object be thrown to reach a height of a 10 story building (about 30.48 m)? Neglect air resistance.